



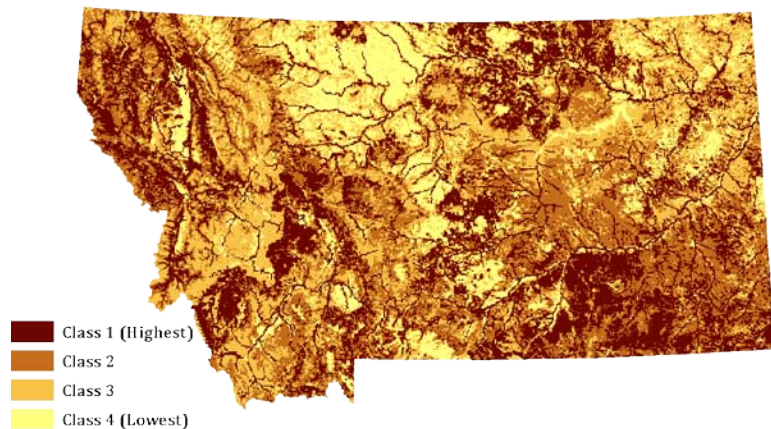
Montana Fish, Wildlife & Parks

Crucial Areas & Connectivity Assessment



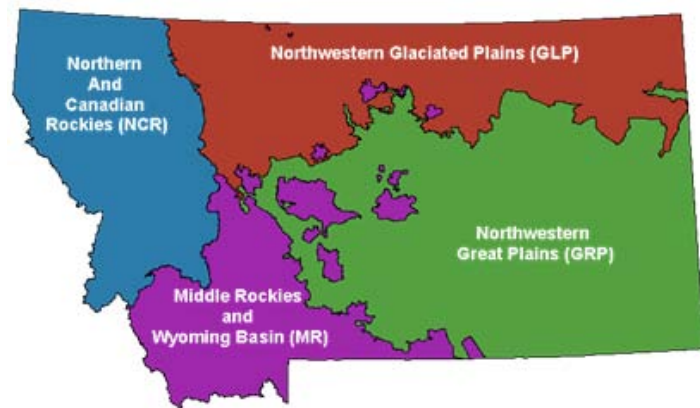
TERRESTRIAL SPECIES RICHNESS

SUMMARY: This layer represents species richness of all native land-based species in Montana, including amphibians, reptiles, birds, and mammals. Species included are found year round or breed in the state. The metric presented is the average number of species associated with all cover types (habitats) in each section. This data layer allows you to understand the overall number of species that is associated with each one mile section.



MEASUREMENT UNIT: One-mile section

DATA SOURCE(S) / QUALITY: A spatial dataset representing cover types (habitats), a species-habitat association database, and an ecoregion layer were used to create this layer. The Montana Land Cover, courtesy of Montana Natural Heritage Program (MTNHP) is a data layer created from satellite images that are categorized based on data collected from field measurements. There are 81 ecological classifications in Montana that represent communities such as sagebrush, coniferous forests and grasslands. The second source is a habitat association database created by MTNHP that



DATA SOURCES

- ☐ Survey data – counts or estimates
- ☒ Survey data – categorical (e.g. presence/absence)
- ☒ Expert opinion based on observation

DATA EXTRAPOLATION TECHNIQUE USED

- ☐ None
- ☒ Modeling of habitat-species associations (deductive)
- ☐ Statistical modeling (inductive)
- ☐ Extrapolation to habitat unit (e.g. stream section)
- ☐ Extrapolation based on expert opinion

associated all vertebrate species in Montana with Ecological Systems (habitats) according to the degree of association between the species and a given habitat: high, moderate, or low association. In an effort to compare ecologically different regions of Montana, four ecoregions based on Omernick Level 3 ecoregions (see Figure above), were created to summarize species richness. Area within each ecoregion was scored separately: 1)



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Northern and Canadian Rockies (NCR), 2) Middle Rockies, Idaho Batholith, & Wyoming Basin including island mountain ranges (MR), 3) Northern Glaciated Plains (GLP), and 4) Northwestern Great Plains (GRP).

METHODS: Habitats with “high” or “medium” suitability were used to create species-habitat associations for most vertebrate species in Montana. The resulting models were summed (taking into account the known range of each species) for each cell in the Ecological

CLASS	(Number of species associations)				% OF STATE
	NCR	MR	GLP	GRP	
1 (Highest)	90-176	61-129	68-103	74-103	29 %
2	71-89	55-60	52-68	60-74	29 %
3	48-70	42-55	17-51	32-59	28 %
4 (Lowest)	0-47	0-41	0-16	0-31	14 %

Systems layer. Scores for all cells in a given section were averaged to arrive at an average species richness score for each square-mile section. The highest scores (class 1) from both the wetland and riparian layers were “burned in” to this layer in the final step to account for high species richness that could not be represented using Montana Land Cover.

FINAL CATEGORIZATION: Raw scores were divided into four classes for each ecoregion. Scores from all four ecoregions were merged together to form a single statewide layer.

Table 1. Ecological systems used in richness calculations.

Ecological System (Ctrl + click system name to go to Montana Field Guide)
Great Plains Badlands
Rocky Mountain Cliff, Canyon and Massive Bedrock
Alpine Ice Field
Rocky Mountain Alpine Bedrock and Scree
Shale Badland
Great Plains Cliff and Outcrop
Active and Stabilized Dune
Wyoming Basin Cliff and Canyon
Aspen Forest and Woodland
Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest
Rocky Mountain Subalpine Woodland and Parkland
Rocky Mountain Mesic Montane Mixed Conifer Forest
Rocky Mountain Foothill Limber Pine-Juniper Woodland
Rocky Mountain Lodgepole Pine Forest
Rocky Mountain Ponderosa Pine Woodland and Savanna
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
Rocky Mountain Montane Douglas-fir Forest and Woodland
Rocky Mountain Poor Site Lodgepole Pine Forest
Great Plains - Black Hills Ponderosa Pine Woodland and Savanna
Aspen-Mixed Conifer Forest and Woodland
Mountain Mahogany Woodland and Shrubland



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Ecological System (Ctrl + click system name to go to Montana Field Guide)
Great Plains Wooded Draw and Ravine
Mat Saltbush Shrubland
Alpine Dwarf-Shrubland
Low Sagebrush Shrubland
Big Sagebrush Shrubland
Mixed Salt Desert Scrub
Great Plains Shrubland
Rocky Mountain Lower Montane-Foothill Shrubland
Rocky Mountain Montane-Foothill Deciduous Shrubland
Mountain Subalpine Deciduous Shrubland
Rocky Mountain Foothill Woodland Steppe Transition
Big Sagebrush Steppe
Montane Sagebrush Steppe
Rocky Mountain Lower Montane, Foothill and Valley Grassland
Rocky Mountain Subalpine-Upper Montane Grassland
Great Plains Mixedgrass Prairie
Alpine Fell-Field
Alpine Turf
Rocky Mountain Subalpine-Montane Mesic Meadow
Great Plains Sand Prairie
Greasewood Flat
Rocky Mountain Conifer Swamp
Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland
Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland
Great Plains Floodplain
Rocky Mountain Wooded Vernal Pool
Rocky Mountain Subalpine-Montane Riparian Woodland
Rocky Mountain Subalpine-Montane Riparian Shrubland
Great Plains Prairie Pothole
Alpine-Montane Wet Meadow
Great Plains Open Freshwater Depression Wetland
Emergent Marsh
Rocky Mountain Subalpine-Montane Fen
Great Plains Closed Depression Wetland
Great Plains Saline Depression Wetland
Great Plains Riparian

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